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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,630	03/06/2002	David S.Y. Hsu	83,661	5396

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 07/16/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/090,630

Applicant(s)

HSU ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>Z</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 18-27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure as originally filed supports the concept of repeating steps (d) and (e) until a thickness is achieved (e.g., p. 12, lines 12-p. 13, line 2; Examples 1 and 2), but does not provide support for the concept of repeating steps (a)-(c). (Note: The issue may be resolved by amending step (f) to state "repeating steps (d) and (e) to produce a film", as was done in amendment B (Paper No. 5, filed 11/18/2002). However, Applicant has apparently inadvertently restored the original language of claim 18, step (f), as it was presented in the preliminary amendment (Paper No. 2).)

Claim Interpretation

3. The phrase "repeating steps (a) through (e) as needed" in claim 18, step (f) has been interpreted in light of the specification, which does not disclose the repetition of steps (a)-(c) for each layer of sol-gel applied, as including both the possibility that no repetition is necessary if the desired film thickness is achieved by a single coating and the possibility that the steps (a)-(e) need not each be repeated the same number of times.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 18-27 are rejected under 35 U.S.C. 103(a) as being obvious over Fratello et al. (U.S. Patent 4,965,091, hereafter '091) in view of Harmer et al. (U.S. patent 5,824,622, hereafter '622) and Forster et al. (U.S. Patent 5,611,961, hereafter '961).

Claims 18, 26-27: '091 teach a method of preparing a multilayer phosphor product (col. 3, lines 51-59) of terbium-activated yttrium orthosilicate (col. 4, lines 1-5) on a substrate comprising the steps of:

a) providing a solution comprising an yttrium precursor and a terbium (i.e., dopant) precursor (col. 4, lines 12-16). In the example, the yttrium precursor is a nitrate. However, col. 3, lines 26-48 teach that the yttrium precursor may be an alkoxide instead;

b) mixing said solution with a silicon precursor (col. 4, lines 6-19);

c) inducing a sol-gel condensation reaction comprising the precursors (col. 3, lines 48-52);

d) spreading the sol-gel mixture on a substrate (col. 3, lines 51-52; col. 4, lines 35-39);

e) drying the sol-gel reaction mixture (col. 3, lines 53-56; col. 4, lines 37-39);

f) repeating steps (d) and (e) if necessary to produce a desired thickness producing a desired thickness of film (col. 3, lines 52-56); and

g) heating the thick film to form the phosphor (col. 3, lines 60-64).

'091 does not teach that the silicon precursor is a solid particle with an average particle size of about 7 nm. '091 teaches that the purpose of the alkoxide precursors is to form a continuous [metal] cation-oxygen network (col. 3, lines 56-59). Tetraethyl orthosilicate (TEOS) is a preferred precursor of such networks. '622 teaches a variety of operative silicon -containing

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precursors for forming metal oxide networks, including TEOS and fumed silica (col. 5, lines 4-40). The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used fumed silica as the particular silicon precursor of '091 because '622 teaches that fumed silica is operative as a sol-gel precursor for the formation of metal oxide networks.

'622 is silent as to the diameter of the fumed silica. Therefore, '091 and '622 do not teach that the fumed silica has an average particle diameter of about 7 nm. However, '961 teaches the formation of phosphor for precursors, including fumed silica with average particle sizes of less than 50 nm (Abstract, claim 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used average particle sizes of less than 50 nm for the fumed silica of '091 and '622 because '961 teaches the operability of such particle sizes as the particle size of fumed silica when use as a phosphor precursor. The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range, including an average particle diameter of about 7 nm, disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

'249 does not teach the repetition of the spreading and drying steps. However, the Examiner takes Official Notice that it is extremely well known in the sol-gel art that a desired thickness may be achieved by repeated application and drying of the sol-gel mixture. See, e.g., '091, col. 3, lines 53-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have repeated the applying and drying steps of '249 in order to have achieved the desired coating thickness.

Claim 19: '091 teaches that the solution may contain water, a hydrolysis agent (col. 4, lines 14-17).

Claims 20-21, 23-24: '091 teaches that additional water, one of applicant's particularly claimed hydrolysis agents, may be added just before gellation begins (col. 3, lines 48-52; col. 4, lines 13-34).

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Claim 22: The solution may contain hydrochloric acid (col. 4, lines 14-16), a reagent capable of inhibiting condensation reactions (see application, p. 9, lines 8-11).

Claim 25: The dopant precursor may be terbium nitrate (col. 4, lines 14-16), an inorganic salt.

Response to Arguments

7. Applicant's arguments filed 4/25/2003 have been fully considered but they are not persuasive.

Applicant argues that the phosphor of the present application is the product of a sol-gel reaction whereas the phosphor layer of the prior art (Haluska) merely encases a phosphor in a sol-gel reaction product. Applicant has amended the claim to positively recite that the "solid particle precursor" reacts. Further, Applicant has amended to recite a particular particle size. Accordingly, the rejections based on Haluska are withdrawn.

However, the arguments are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The effects of such additional water are more clearly described by Levene '224, col. 2, lines 56-66. See discussion of Levene in prior actions. Kilian '750 is cited of interest for its discussion of the use of acid to prevent premature gellation (col. 3, lines 54-57. See discussion in prior actions.)

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 9-5:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read "Michael Cleveland".

Michael Cleveland
Patent Examiner
July 13, 2003